Space Weather Forecast

Issued on Monday, 04 March 2024 at 13:15 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of isolated Moderate flares throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Low despite eight sunspots being present on the visible disc. Two moderately large, complex regions in the western hemisphere both underwent slight simplification and decay during the period. The remaining regions are smaller and appear mostly stable. No new Earth-directed Coronal Mass Ejections (CMEs) were observed in imagery. A southward directed coronal mass ejection from around 03/1400 UTC has been analysed as potentially giving a glancing blow at Earth on 07 Mar.

Solar Wind / Geomagnetic Activity: Solar winds parameters indicated the ongoing then waning effects of one or more coronal mass ejections. Solar wind speeds were largely slow-ambient. Total magnetic field strength, IMF, was moderate to strong during 03 March, then fell back to consistently Moderate during 04 March. The north-south component varied between strongly positive and negative initially, with sustained periods of negative Bz (southward) until 03/2300 UTC, after which it became mostly positive (northward). G1-G2/Minor to Moderate storms were observed between 03/1200-2100 UTC, followed by two Active intervals (Kp 4) before eventually becoming Quiet (Kp 1) to end the period.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels with no radiation storms observed.

Aurora: Sightings of Aurora were documented across the UK and even to southern parts of England whilst looking northward at elevation on the evening of 03 March during the peak of the geomagnetic storm. This was aided by the largely clear skies across the UK at the same time.

Four-Day Space Weather Forecast Summary

Solar Activity: Low activity is expected, with a chance of isolated Moderate-class flares.

Solar Wind / Geomagnetic Activity: Waning coronal mass ejection effects continue to diminish on day 1 (04 Mar). A southward directed coronal mass ejection from 03 March may give glancing impacts on day 4 (07 Mar). Slow-ambient solar wind speeds are still being observed and are expected to remain at background levels with no significant enhancements anticipated during days 1-3 (04-06 Mar), glancing coronal mass ejection impacts on day 4 (07 Mar) may bring slightly elevated wind speeds at Earth. Quiet geomagnetic activity is expected throughout, with a chance of Unsettled to Active activity and a slight chance of G1/Minor Storms on day 1 (04 Mar) due to residual coronal mass ejection impacts, and again on day 4 (07 Mar) from glancing coronal mass ejection impacts.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to persist at background levels, but with a slight chance of rising above the S1/Minor Radiation Storm threshold on day 1 (04 Mar) in response to any notable flares from the large sunspot which rotated beyond the northwest limb during 02 Mar.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	5	1	1	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	30	25	25
Very Active	R3 to R5 X	No	5	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	5	5	5
Very Active	≥ S3 *	No	2	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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